



PLATELET-RICH PLASMA INJECTIONS FOR THE TREATMENT OF CHRONIC PLANTAR FASCIITIS

Orthopaedics

Dr.Katukota Vishal*

Assistant Professor, Department of Orthopaedics, BIRRD(T) Hospital, Sri Padmavathi Medical College for Women.*Corresponding Author

Dr. Naresh Kumar Eamani

Assistant Professor, Department of Orthopaedics, BIRRD(T) Hospital, Sri Padmavathi Medical College for Women.

Dr Deepak Kaki

Associate Professor, Department of Orthopaedics, BIRRD(T) Hospital, Sri Padmavathi Medical College for Women.

ABSTRACT

Plantar fasciitis is a common cause of heel pain and various modalities of treatment exists.PRP is derived from autologous blood containing high concentration of growth factors that helps in healing of tissues. The use of PRP in plantar fasciitis is recent and an evolving concept. The purpose of our study is to evaluate the effectiveness of PRP in the treatment of chronic plantar fasciitis.

KEYWORDS

INTRODUCTION

Chronic plantar fasciitis is due to inflammation of insertion of plantar fascia on medial process of calcaneal tuberosity, a common problem in sports participants and middle aged individuals between 40-60 years. This condition is self limiting and most of the cases resolve spontaneously without any intervention. With increasing knowledge on pathology there are various modalities of conservative treatments for recalcitrant plantar fasciitis including physiotherapy, ice packs ,night splints, plantar fascia stretching exercises ,shoe modification, NSAIDS, extracorporeal shock wave therapy when conventional therapy is ineffective. Usually symptoms will disappear after non surgical treatment in 80 percent of patients, in 10 percent patients symptoms do not improve with conservative treatment and further develop into chronic recalcitrant plantar fasciitis.

Satisfactory results were reported in recent times with the use of Platelet rich Plasma injections for treating muscle and tendon injuries and degeneration and bone healing .The rationale for using PRP is to increase the tendon regenerating abilities with high content of cytokines and cells in hyper physiological doses which would promote cellular chemo taxis, matrix synthesis and proliferation. Degranulation of alpha granules in platelets releases different growth factors that can play in tissue regeneration process.

Aim Of The Study

Purpose of the study was to study the effectiveness and the safety of PRP injections for treating chronic plantar fasciitis

MATERIALS AND METHODS

This study was conducted in orthopaedic department of Birrds ,Tirupati, between 2022 Nov to 2023 Nov.20 patients were selected from outpatient department of Birrds with symptoms of chronic plantar fasciitis. The average follow-up period was 12 months

Inclusion Criteria

Patients were included if they were ≥ 25 years, having heel pain felt maximally over the plantar aspect of foot for more than six months continuously and had radiographic evidence of calcaneal spur. Patients were treated previously with 3 months of conservative therapies, such as ice packs, stretching of the Achilles tendon and NSAID medication, which provided inadequate improvement of pain and functionality.



Xray Foot With Calcaneal Spur

Exclusive Criteria

1. Generalised inflammatory arthritis, including ankylosing spondylitis, Reiter syndrome, rheumatoid arthritis or psoriatic arthritis
2. Any wound or skin lesion at the plantar aspect of the foot, severe infection, pregnancy, known bleeding disorder, malignancy ,previous ESWT, surgery or steroid injection into the heel, including Achilles tendon; nerve-related symptoms such as radiculopathy, tarsal tunnel syndrome ,foot and ankle osteoarthritis

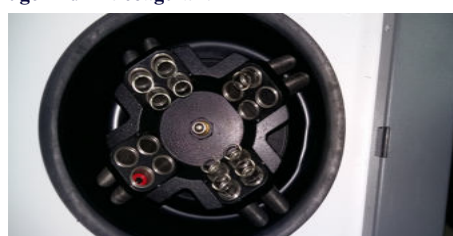
Technique

- 10 ml of blood is collected from the arm of the person into a 10 cc syringe and 2.5cc blood is injected into four test tubes and 0.25ml of sodium citrate is added to each test tube.
- Test tubes are centrifuged(soft spin) at 1500rpm for 10 minutes, first plasma along with Buffy coat is extracted into another syringe and this is centrifuged(hard spin) again at 2000 rpm for 15 minutes
- After centrifuging test tube is extracted and upper 2/3 contains platelet poor plasma is discarded lower 1/3 contains platelet rich platelet rich plasma is now extracted into another syringe

The injection point was at the origin of the plantar fascia on the medial tubercle of the calcaneus. The origin of the plantar fascia was approached from the medial side of the foot but near the plantar surface. After injection, all patients were allowed to immediately walk but were advised to avoid weight-bearing sport activities, such as running or jumping, for at least four weeks after the last injection. NSAIDs were prescribed for no more than three days after injection, and ice packs were allowed for post injection pain.



Centrifuge And Anticoagulant





Fractionated Blood Showing Platelet Rich Plasma In The Top And RBC's In The Bottom After Centrifugation



Local Anaesthesia Is Given After Sterile Draping And The Origin Of The Plantar Fascia Was Approached From The Medial Side Of The Foot But Near The Plantar Surface

OBSERVATION

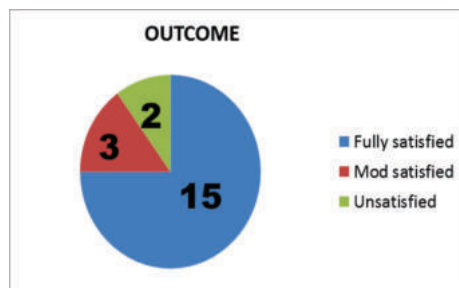
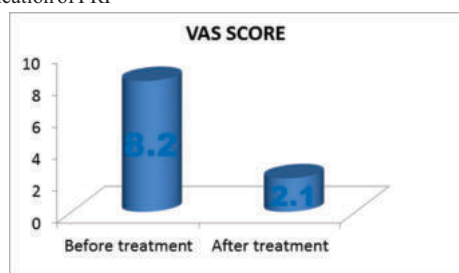
Pain was evaluated using visual analogue scale (VAS). The scale recorded the patients complain of pain using a scale of 0 to 10 where 0 is pain free and 10 is worst pain. The scale was a 10 cm line beginning with 0 and ending with 10. The scale was marked at the line that corresponded with the patient's response.

VASS SCORE

SCORE	RATING
0	No pain
1-3	Mild pain, little interference with adl (daily activities)
4-6	Moderate pain interfering with adl
7-10	Severe pain, unable to perform adl

RESULTS

Patients were followed up at 4, 8, 12, 24, 36 and 48 weeks. The average visual analogue score was 8.2 before injection. 68 % has severe limitation of activities. The average post injection pain decreased to 3.15. 15 patients were fully satisfied, 3 patients were moderately satisfied and 2 patients were unsatisfied. None of them experienced any complication of PRP.



DISCUSSION

Plantar fasciitis is a common cause of foot pain and many treatment options exist. In animal studies it has been found that addition of growth factors to the ruptured tendons has led to healing of tendons.

In human studies it has been found that injection of PRP into tendon decreases pain.

PRP is an ideal autologous biological blood derived product which when given to different tissues releases high concentration of growth factors derived from platelets like platelet-derived growth factor (PDGF), platelet-derived endothelial growth factor (PDEGF), transforming growth factor (TGF), Interleukins 4,8,13,17, tumour necrosis factor alpha, and interferon alpha. This increases healing of tendons and wounds. This combination of growth factors and anti-inflammatory and pro-inflammatory cytokines present in the platelet-granule have been shown to initiate the healing stages necessary to reverse the degenerative process at the base of the plantar fascia, enhance fibroblast migration and proliferation, increase vascularisation, increase collagen deposition, removal of tissue debris, angiogenesis and laying extracellular matrix [17,19,20]. Transforming growth factor beta one (TGF-B1) is shown to significantly increase type I collagen production by tendon sheath fibroblasts.

Centrifugation is a simple technique and may yield platelet concentrates three to eight-fold higher than whole blood [38]. Centrifugation has two parameters that may influence the outcome of platelet concentrate. The first is whether it is done once (single spin) or twice (double spin). The second is the centrifugation speed. In the present study, the blood was centrifuged using a double centrifugation.

Researchers advocate a double-spinning technique instead of a single-spinning method because the former generates a higher platelet concentration of 6x to 9x and thus results in better efficacy of the final PRP product [39,40]. In a study, a double centrifugation technique was performed in plantar fasciitis. The resulting platelets concentrate contained approximately 6-8 times the concentration of platelets compared to baseline whole blood.

The other advantage of PRP is it has antimicrobial activity and prevents infections. The body's natural healing process is stimulated once platelets get activated and growth factors are released. Injections of PRP are found to be safe and does not affect any biomechanical function of the foot and the successful findings in PRP injection indicate it may become a common modality of treatment in treatment of chronic plantar fasciitis.

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